



JAN 03 2001

MONTANA OFFICE

**TECHNICAL IMPRACTICABILITY EVALUATION FOR GROUNDWATER
RESTORATION, FORMER SOMERS TIE TREATING PLANT, SOMERS, MONTANA**

GENERAL COMMENTS:

- A. Review of this document would have been greatly facilitated if BNSF had been required to present information as set forth in the Environmental Protection Agency (EPA) "Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration," Interim Final, Directive 9234.2-25 (September 1993). Instead, the reader had to try to discern the information by rereading sections. It is important that if finally approved, the format in this document does not provide precedent for future Technical Impracticability (TI) evaluations within Montana. It would be preferred to have BNSF provide the information in the guidance format.
- B. The document concludes that the groundwater clean up levels specified in the Record of Decision (ROD) qualify for a technical impracticability waiver. This is incorrect. In fact, the groundwater clean up levels listed in the ROD are not ARARs, but are risk-based numbers, and so cannot be waived. The actual ARARs, which are State and federal groundwater standards, are the subject of a potential waiver, rather than the human health standards listed in the ROD and Explanations of Significant Difference (ESD). The contaminants of concern and corresponding standards need to be presented in the TI evaluation, and would be separately waived by EPA if appropriate. Coupled with this, protection of human health and the environment could be achieved in a revised EPA remedy by eliminating exposure to levels not protective of human health and the environment. This comment is especially pertinent to Section 5.1 of the TI Evaluation document.
- C. DEQ suggests that a concise, well-written Executive Summary be added to the document.
- D. The document does not consistently provide data citation and analysis to support statements made. Sources of information should be cited throughout the document, and conclusions should be well explained. TI guidance states that references should be as explicit as possible, citing specific pages and table numbers, and that technical discussions and conclusions should be supported by data compilation, statistical analyses or other types of data reduction.

As an example, in Section 3.2, Site-wide Groundwater Quality, results of Mann-Kendall and Kruskal-Wallis statistical analyses are discussed, but the analyses and associated calculations are not provided with the document for review.

- E. A TI decision must be based on the groundwater restoration remedy's performance – not on the use, potential use, or quality of the groundwater. The use or potential use of the groundwater should be included as part of the basis for selecting an alternate groundwater remedy, and should not be included in the discussion as part of the justification for the TI evaluation and ultimate determination.



491011

- F. Throughout the document, clarification needs to be added as to which aquifer is being addressed: the surficial aquifer, the bedrock aquifer, or both.
- G. The TI Evaluation needs to clearly state the expected restoration timeframe, and to indicate that continuation is unreasonable based on the time to reach existing cleanup requirements. This discussion should be included in a separate section of the document. As written, no information is presented on the expected timeframe for restoration using the existing groundwater treatment system or using alternate remedies. The information provided on the time for contaminants to migrate to either the municipal water system or to Flathead Lake does not describe the expected restoration timeframe.
- H. What are the target cleanup levels for groundwater and surface water?

SPECIFIC COMMENTS:

1. Page 1-1. Paragraph 1. Sentence 4. "This evaluation will show that due to characteristics of the site geology, hydrogeology, and the creosote contamination present in the subsurface, restoration of groundwater to cleanup levels specified in the 1989 Record of Decision (ROD) is technically impracticable." As discussed in General Comment B, the actual ARARs are State and federal groundwater standards, which are the subject of a potential waiver, rather than the risk-based human health standards listed in the ROD and ESD. The contaminants of concern and corresponding standards need to be presented in the TI evaluation, and would be separately waived by EPA if appropriate. Revise the discussion in the document to reflect this issue.
2. Page 1-3. Section 1.2.1. Paragraph 1. "Approximately five years of groundwater remediation at the Somers site indicates that certain groundwater cleanup requirements will not be met using the selected remedy components." Specify the groundwater cleanup requirements that will not be met.
3. Page 1-4. Section 1.2.1 "DNAPL comprise of creosote and other compounds has migrated into the aquifer and become trapped in ..." Clarify that the contamination has migrated into the surficial aquifer and not into the bedrock aquifer.
4. Page 2-6. Section 2.2.1. Specified Soil Remedy. Paragraph 2. "Soil left below the water table in the CERCLA lagoon and swamp would be treated as part of the groundwater component of the remedy." If a TI determination is made for the groundwater remedy at the Somers Site, what impact will this have on the soil remedy in the ROD for the contaminated soils remaining below the water table in the CERCLA lagoon and swamp areas?
5. Page 2-13. Section 2.3.2. Hydrogeology. What is the impact to surface water from the surficial aquifer discharging? Include this information in the discussion of the hydrogeology of the Site.
6. Page 2-14. Section 2.3.3. Aquifer Characterization. It is not clear to which aquifer this section applies. Characterization information regarding both the upper and lower aquifers

should be included in this section. Clarify whether or not the bedrock aquifer is contaminated.

7. Page 2-15. Section 2.4. Source Characterization. It appears that this section was included to demonstrate that the source was removed to the extent practicable. But, as written, this is not clear, and only appears to emphasize the amount of source remaining. Re-write the section to emphasize that the source was removed to the extent practicable, and that soil was even excavated down to groundwater. Also, include explanatory information regarding the reasoning for the lateral area of excavation – why didn't they excavate a larger area (horizontally) of the CERCLA lagoon? Is the residual in the vadose zone not a source of groundwater contamination?
8. Page 2-18. Section 2.4.4. Groundwater Treatment System Influent. Include information regarding the standards for each PAH, etc.
9. Page 2-19. Section 2.4.5. Add a statement (if correct) regarding treatment of the remaining contaminated soil through the groundwater remedy.
10. Page 2-20. Section 2.5.2. Groundwater Beneficial Use. Delete this section as it has no bearing on whether or not the remedy is technically practicable or not. Replace the section with a discussion regarding the classification of the waters at the Somers Site, addressing both the surficial and bedrock aquifers. The State groundwater regulations set forth the beneficial use of groundwater in this area, which is based on specific conductance, not on yield. ARM 17.30.1006 provides that Class I groundwaters have a specific conductance of less than 1000 microSiemens per centimeter at 25°C; Class II groundwaters: 1000 to 2500; Class III groundwaters: 2500 to 15,000; and Class IV groundwaters: over 15,000. The specific conductance and beneficial use of the BN Somers groundwater should be set forth in Section 5.1. The information regarding low yield (backed up by data) could provide further TI information. In addition, the recharge to surface water is an important component. Groundwater in certain areas may need to be remediated to levels more stringent than the groundwater classification standards to achieve the standards for affected surface water. See Compliance with Federal Water Quality Criteria, OSWER Publication 9234.2-09/FS (June 1990) ("Where the ground water flows naturally into the surface water, the ground-water remediation should be designed so that the receiving surface-water body will be able to meet any ambient water-quality standards that may be ARARs for the surface water."). Section 2.5.4 discusses ground water migration to Flathead Lake but does not include an analysis of compliance with surface water ARARs.
11. Page 2-22. Section 2.5.4. Migration to the Town Well. Was the 1990 pumping test conducted with the Somers Public Water System exhibiting maximum drawdown? Please clarify.
12. Page 2-22. Section 2.5.4. Migration to the Town Well. Paragraph 3. Provide clarification on how the seepage velocity for the bedrock aquifer was determined.

13. Page 2-22. Section 2.5.4. Migration to the Town Well. Did the fate and transport analysis assume the pump and treat system was operating? Please clarify.
14. Page 2-22. Section 2.5.4. Migration to the Town Well. Some additional model verification is appropriate. Screening results indicate that dissolved-phase naphthalene requires over 100 years to travel from the top to the bottom of the unconsolidated aquifer. Some discussion of the sampling results in the light of the model predictions would be appropriate.
15. Page 2-22. Section 2.5.4. Migration to the Town Well. The analysis assumes that the Somers site is upgradient of the municipal well. The gradient used by the screening analysis appears to be a static gradient, and does not account for any steepening of the hydraulic gradient induced by well pumping. Please provide clarification regarding this issue.
16. Page 2-23. Section 2.5.4. Migration to Flathead Lake. Paragraph 1. Sentence 1. Change "constituents of concern" to "contaminants of concern."
17. Page 2-23. Section 2.5.4. Migration to Flathead Lake. Paragraph 3. "In general, application of the Domenico solution is appropriate where a dissolved-phase plume has reached steady state (i.e., constant source), or is diminishing." The steady-state assumption is made under the circumstance in which the extraction system is operating. In the *Final Phase II Groundwater Remedy Remedial Design*, it is stated that "Groundwater elevation data indicate that even though the extraction rate achieved with the Phase I system are lower than had been predicted, the hydraulic influence of the groundwater extraction system is significant" (page 3-10). Has the change in hydraulics back to the pre-remedy implementation on the extent of the plume of contamination once the extraction system has been turned off been adequately evaluated, i.e., will the steady-state condition be maintained in this circumstance? The DEQ suggests including summary results of such an evaluation in this TI report, and the evaluation itself in an appendix to the TI report.
18. Page 2-23. Section 2.5.4. Migration to Flathead Lake. Chemical migration to Flathead Lake was evaluated using the Domenico analytical screening model. This document repeatedly states that this model is inherently conservative, which is not accurate. Problems with the Flathead Lake evaluation include the following which require clarification and/or additional discussion in the document:
 - a) The simulations use a literature value for naphthalene degradation. No analysis of field measured data, or any form of reasoning was used to support the assumed biodegradation rate. The model assumes that every year, dissolved naphthalene concentrations away from the source area decrease by one-half. Do the field data support this?
 - b) No attempt was made to correlate model predictions with field-measured data;
 - c) No physical presentation of model output was provided. Several of the input parameters, such as the dispersivity values, were not presented or discussed;
 - d) No discussion of model sensitivity was provided; and
 - e) Appendix C.2.1.3 indicates that travel time to Flathead Lake will increase by an order of magnitude if no biodegradation is occurring. This conclusion does not make sense.

19. Page 2-24. Section 2.5.5. Paragraph 1. Sentence 3. "DNAPL is not present throughout the soil matrix and a discrete pool of DNAPL does not exist." Modify this statement to read ... DNAPL is not present throughout the soil matrix and a discrete pool of DNAPL "*has not been identified*" or "*has not been encountered*."
20. Page 3-8. Section 3.1.3. Regarding the first and third paragraphs on the page. The first and third paragraphs are very similar; the third paragraph appears to be an expansion of the first. Delete the first paragraph, since it pertains more to the "Treatment Area Groundwater Quality" than to "Mass Removal." The third paragraph is fine as it is.
21. Page 3-8. Section 3.1.3. Treatment Area Groundwater Quality. It is not clear that in-situ remediation isn't working. Have groundwater contaminant concentrations across the Somers Site not decreased over time? Please clarify and provide supporting data.
22. Page 3-9. Section 3.2. Site-wide Groundwater Quality. The referenced Figures 3-6 through 3-9 report concentrations of zinc; Section 3.2 does not include a discussion of these data. Revise this section to include a discussion regarding the concentrations of zinc, and indicate whether or not zinc is to be included in the TI Evaluation.
23. Page 3-9. Section 3.2. Paragraph 3. (also Figures 3-6 through 3-9). Sampling of well S-91-2 is discussed in this section. The location of well S-91-2 is not depicted on Figures 3-6 through 3-9. Add the location of well S-91-2 to these figures.
24. Page 3-10. Section 3.2.1. Paragraph 1. Sentence 1. "Historical TPAH concentrations from June 1984 through March 2000 (Table 3-4) were used to conduct the statistical analyses to determine if the data exhibits trends in groundwater quality." Table 3-4 was not included in the document for review.
25. Page 3-10. Section 3.2.1. Paragraph 1. Sentence 2. "The appropriate statistical analyses of the data originating from monitoring wells are outlined in the *Protocol for the Statistical Analysis of Groundwater Data* (RETEC, 1998 located in Appendix D)." Appendix D does not discuss the statistical analyses nor does it present the results of the analyses, but discusses the basis for selecting wells to include in the analyses. Revise the sentence to state "The appropriate selection of monitoring well data to include in the statistical analyses is outlined in the *Protocol for the Statistical Analysis of Groundwater Data* (RETEC, 1998 located in Appendix D)." Also, include the actual analysis in the appendix.
26. Page 4-2. Section 4.2. Evaluation of Phase I Operational Performance. Modify the heading for this section to read "Operational Performance of Groundwater Remedy."
27. Page 4-4. Section 4.3. The evaluation of other technologies in this document incorrectly parallels a screening phase of a Feasibility Study (FS). According to TI guidance, a TI evaluation should provide a demonstration that no other remedial technologies (conventional or innovative) could reliably, logically, or feasibly attain the cleanup levels at the site within a reasonable timeframe. Such an evaluation should be performed. In addition, timeframes

should be provided for each alternative so that EPA can determine the reasonableness of the timeframes.

In addition, when restoration of ground water to beneficial use is not practicable, and a waiver of ARARs for groundwater is obtained, EPA expects to prevent further migration of any contaminant plumes, prevent human exposure to the contaminated groundwater, and evaluate further risk reduction measures. The document does not discuss these elements except for institutional controls and natural limitations to limit exposure.

28. Page 4-4. Section 4.3. Phase II Alternate Groundwater Remedies. Re-title the section to read "Alternate Groundwater Remedies."
29. Page 4-4. Section 4.3. Paragraph 1. Sentence 4. "These controls may not be the same for each alternative, rather they would vary depending on the time frame land area needed for remediation." A word or two appears to be missing in this sentence.
30. Page 4-6, Section 4.3: It is unclear why a physical barrier system was not evaluated for Flathead Lake or the Somers municipal water supply.
31. Page 4-6, Section 4.3: It is unclear why soil removal beneath the lagoon was not evaluated with such a large portion of contaminated soil remaining. Did the final Phase II groundwater remedy remedial design look at alternatives like soil washing, etc.?
32. Page 4-6, Section 4.3.1. Alternative 6. Sentence 2. BNSF can not legally designate a controlled groundwater area (CGA). Designations are provided by the Montana Department of Natural Resources and Conservation, pursuant to § 85-2-507, MCA. Modify sentence 2 to read "... and designation of a Controlled Groundwater Use area would be pursued to prevent extraction ..."
33. Page 4-6. Section 4.3.1. Alternative 6 – Institutional Controls. Since the information in this section is sufficiently summarized in Table 4-1, delete this section and renumber subsequent sections accordingly. Associated with the deletion of this section, in the paragraph preceding the section delete the second, third, and fourth sentences.
34. Page 4-7. Table 4-1. Low yield and high iron should not be relied on or even considered in effectiveness under institutional controls. Delete (*low yield and high iron*) from the effectiveness column for institutional controls.
35. Page 4-8, Section 4.3.2: The determination of whether ground water restoration is practicable is not, as the text states, ground water restoration "within a reasonable time frame at a reasonable cost." EPA guidance discusses over one hundred years as possibly indicating beyond a reasonable time, while this document discusses fifty. This document does not provide estimates for restoration timeframe for either the existing remedy or for alternates. The guidance also discusses inordinate cost as being a factor, not restoration for a reasonable cost. Cost plays a subordinate role. To properly evaluate a TI, the correct factors from guidance must be used.

36. Page 4-8. Section 4.3.2. Paragraph 2. Delete this paragraph, as it repeats information discussed previously in Section 4.3.
37. Page 4-8. Section 4.3.2. Paragraph 3. Sentence 1. Revise the sentence to read "The review of alternatives presented above indicates that continued or expanded/modified ..."
38. Page 4-8. Section 4.3.2. Paragraph 3. Sentence 2. "... and, as a result, there is no demonstrable risk associated with the presence of contaminated groundwater at the Somers site." Revise the statement to read "... and, as a result, there is *minimal demonstrable* risk associated with the presence of contaminated groundwater at the Somers site."
39. Page 5-1, Section 5.1. The ARARs and clean up goals section should include the recently adopted State groundwater standards for the contaminants of concern. Although EPA may not yet make them part of the remedy until the next five year review, it is important to note them in the TI evaluation, which serves as a basis for a TI waiver. The cleanup standards listed in the ROD were based on risk assessment, not on ARARs. This document should list all contaminants and the corresponding contaminant-specific ARAR, both state and federal. In addition, surface water ARARs should be presented because of the recharge to Flathead Lake, although the text should make clear that no waiver of these standards are being sought.
40. Page 5-2. Section 5.2. Paragraph 1. Why apply TI to bedrock aquifer when it's not impacted? Shouldn't we ensure it doesn't become impacted?
41. Page 5-2, Section 5.2: Paragraph 1. The basis for the vertical extent of contamination should not be where a controlled groundwater area could exist but instead be where groundwater restoration is technically impracticable. This should be documented with data and analysis. In addition, the spatial extent of the TI zone should be limited to as small an area as possible, given the circumstances of the site.
42. Page 5-2. Section 5.2. Paragraph 1. Sentence 4. "Groundwater extraction from the area of the TI will be eliminated in both the surficial and bedrock aquifer through the application of a Controlled Groundwater Use Area." Modify this statement as follows: "The designation of a Controlled Groundwater Use Area will be pursued to eliminate groundwater extraction from both the surficial and bedrock aquifers in the area designated by the TI waiver." [Note: In recent meetings regarding the CGA permit application, the approach has been to pursue a CGA designation for the only the surficial aquifer. This does not correspond to the discussion included in the TI Evaluation document.]
43. Page 5-3, Sections 5.2.1 and 5.2.2. Areal Extent of the Technical Impracticability Waiver. The horizontal extent of a TI waiver is not based on property boundaries, but instead on an area where groundwater restoration is technically impracticable. DEQ notes that, as depicted in document figures, a number of wells (S-6, S-88-1, and S-88-2) exhibiting contaminant levels exceeding the remediation goals set forth in the ROD are located very near the BNSF property boundaries. In addition, while the areal extent of the TI zone may generally include all portions of the contaminated groundwater that do not meet the required cleanup levels, the

TI zone should comprise the area in which it is determined that groundwater restoration is technically impracticable. This should be documented with data and analysis. In addition, the spatial extent of the TI zone should be limited to as small an area as possible, given the circumstances of the site. These sections should be revised accordingly.

44. Page 5-3. Section 5.2.2. Sentence 3. "...the exact area of ARAR exceedance could fluctuate based on seasonal changes in the groundwater..." According to the footnote on page 5-3, seasonality trends have not been observed. This appears to be contradictory. Clarify this apparent contradiction.
45. Page 6-1. Section 6. See Specific Comment 38 with regards to reasonable cost.
46. Page 6-2. Section 6. The document states that a "well-documented case" has been presented for a TI evaluation. This document does not provide this for those unfamiliar with the site. It would be preferred to have the information provided in the guidance format set forth in the EPA "Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration," Interim Final, Directive 9234.2-25 (September 1993). The low permeability of the aquifer, coupled with a screening of alternatives, does not provide the documentation needed to conclude that compliance with the requirements is technically impracticable from an engineering perspective.
47. Page 6-2. Section 6.1. Recommended Action. Second bullet. "Where possible, institutional controls will be strengthened through local and state agencies to prevent the installation of groundwater supply wells within the waiver area." Modify the wording to "Institutional controls will be pursued through local and state agencies to prevent the installation of groundwater supply wells within the area of contamination."
48. Figure 2-4. Estimated Extent of Dissolved PAH Plume and NAPL Occurrence. The estimated extent of the dissolved PAH plume is not shown on this figure nor is there a symbol for the dissolved PAH plume extent in the figure's legend.
49. Appendix B. Page B-2. Section B.2. Boundary Conditions. Paragraph 3. Sentence 5. "These pumping/injection rates were assigned to each of the active wells (Figure 1)." Figure 1-1 does not depict the locations of either injection wells or extraction wells. Please add these locations to Figure 1-1.
50. Appendix B. Page B-3. Section B.3. Paragraph 2. Sentence 6. "The well data and regression equation are presented in Table B-1." Table B-1 is not included in Appendix B.
51. Appendix B. Page B-5. Section B.3. 4. Use Still Lower Hydraulic Conductivity. On the last line of the page, there is an incomplete statement: "Under non-pumping conditions: " It would appear that there should be a page B-6, which is currently not included in the Appendix.
52. Appendix C. Pages C-3 and C-4. Section C.1.3. Paragraph 4. In this paragraph, all references to equation (8) should be changed to refer to equation (9).

TYPOGRAPHICAL ERRORS

Page 2-9. Section 2.3.1. Regional Geology. Paragraph 2. Sentence 1. "(Konizeski and other, 1968)" should read "(Konizeski and others, 1968)."

Page 2-23. Section 2.5.4. Migration to the Town Well. Paragraph 6. Sentence 4. town well, not "own well."

Appendix D. Page D-2. Wells with sufficient data. Paragraph 4. Sentence 1. "form" should be changed to "from."



Montana Department of
ENVIRONMENTAL QUALITY

ENVIRONMENTAL
PROTECTION

JAN 08 2001

MONTANA OFFICE

Judy H. Martz, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • www.deq.state.mt.us

January 5, 2001

Mr. James C. Harris, P.E.
U.S. EPA Region VIII, Montana Office
301 S. Park, Federal Building
Helena, MT 59626

**RE: TECHNICAL IMPRACTICABILITY EVALUATION FOR GROUNDWATER
RESTORATION, FORMER SOMERS TIE TREATING PLANT, SOMERS, MONTANA**

Dear Mr. Harris: *Jim*

The Montana Department of Environmental Quality (DEQ) has reviewed the Technical Impracticability Evaluation for Groundwater Restoration for the Former Somers Tie Treating Plant in Somers, Montana. Comments regarding this document are attached.

Please call me if you have any questions regarding these comments.

Sincerely,

Lisa M. DeWitt